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ABSTRACT

Research on the composing process conducted from 1946 until the present is summarized in this paper. Concentrating on research dealing with the process of writing, the paper does not include studies of written products, language development, or the effects of instruction. The research is arranged in chronological order from the earliest to the most current, concluding with three recent studies focusing only on one element of the process--revision. The paper concludes with an overview of the findings of the research efforts. (FL)

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THE COMPOSING PROCESS: A SUMMARY OF THE RESEARCH

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ABSTRACT

The research studies on the writing process are reviewed, with projects summarized in chronological order from the earliest to the most current studies. An overview of the results is also presented.

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THE COMPOSING PROCESS: A SUMMARY OF THE RESEARCH

Ann Humes

During the past decade, research on the composing process has burgeoned, with the number of very recent studies far exceeding the total for the first half of the 1970's. This paper summarizes the body of research on the composing process, but does not include studies of written products (e.g., Crowhurst & Piche, 1979), studies of language development (e.g., Loban, 1976), or studies on the effects of instruction (e.g., O'Hare, 1973). The summary describes the projects in chronological order from the earliest to the most current, concluding with three recent studies that focus on only one element of the process--revising. The paper then provides a brief overview of the research results.

Research

The earliest study of the composing process was conducted in 1946, when John Van Bruggen investigated the rate of flow of words during composing. Van Bruggen's subjects were 42 boys and 42 girls in junior high school. Van Bruggen was an enterprising researcher; he devised an elaborate system of "hardware" that consisted of a kymograph, rollers, motor-driven punch, magnetic coils, a disc with wires, springs, magnetic coils, and a copper stylus. This hardware was necessary in that pre-computer, pre-videotape era to record the activities of an examiner who sat behind a one-way screen and simulated each of the 84 participants' writing bursts and pauses.

Van Bruggen found that good writers spend more time in long pauses, while less competent writers pause for briefer periods. Additionally,

good writers often pause before they write whole segments of text, while poor writers frequently pause before sentence- and word-level tasks. Van Bruggen also discovered that students who had mastered drafting skills, as measured by high scores on usage tests, wrote at a rapid rate between pauses; students who had not mastered drafting skills wrote more slowly.

The next major research was undertaken by Janet Emig in 1971. Her study is particularly significant because it has served as a prototype for many subsequent projects. Emig studied eight high school seniors who were identified as good writers by the chairs of the local English departments. She met with each student four times. During those tape-recorded sessions, students simultaneously composed aloud and on paper while they were being observed by the examiner, who was in the same room. The investigator also interviewed each student.

An abbreviated version of the outline Emig used to analyze her data is presented in Table 1. Her data suggested that students did little planning before they began translating on paper, and they seldom outlined. She also found that students' composing processes for self-sponsored writing (i.e., writing students decided to do themselves) differed from those for school-sponsored writing (i.e., assigned by teachers): The students planned longer and reformulated more for self-sponsored writing; they also evidenced more instances of clearly discernible starting and stopping behavior. Emig concluded that students should be allowed to do more self-sponsored writing in order to encourage good writing behavior.

Mischel (1974) replicated Emig's design, with similar results, in his study of a 17-year-old high school student referred to as "Clarence." Mischel found that all Clarence's planning, both at the

TABLE 1

ABBREVIATED VERSION OF EMIG'S OUTLINE FOR ANALYZING DATA

1. Context of Composing
2. Nature of Stimulus
   - Registers:
     - Field of Discourse
     - Mode of Discourse
   - Self-Encountered Stimulus
   - Other-Initiated Stimulus:
     - Assignment by Teacher
     - Reception of Assignment by Student
3. Prewriting
   - Self-Sponsored Writing:
     - Length of Period
     - Nature of Musings and Elements Contemplated
     - Interveners and Interventions
   - Teacher-Initiated (or School-Sponsored Writing)
     - Same categories as for Self-Sponsored
4. Planning
   - Self-Sponsored Writing
     - Initial Planning
     - Later Planning
   - Teacher-Initiated Writing
     - Same categories as above
5. Starting
   - Self-Sponsored Writing
     - Seeming Ease/Difficulty of Decision
     - Element Treated First Discursively
     - Context & Conditions under which Writing Began
     - Interveners and Interventions
   - Teacher-Initiated Writing
     - Same categories as above
6. Composing Aloud: A Characterization
   - Selecting and Ordering Components
   - Anticipation/Abeyance
   - Kinds of Transformational Operations
   - Style
   - Other Observed Behaviors
     - Silence
     - Vocalized Hesitation
   - Tempo of Composing
     - Combinations of Composing and Hesitational Behaviors
   - Theoretical Statements concerning Spontaneous Speech
7. Reformulation
   - Type of Task
     - Correcting
     - Revising
     - Rewriting
   - Transforming Operations
     - Addition
     - Deletion
     - Reordering or Substitution
     - Embedding
8. Stopping
   - Formulation
     - Seeming Ease/Difficulty of Decision
     - Element Treated Last
     - Context and Conditions under which Writing Stopped
     - Interveners and Interventions
     - Seeming Effect of Parameters and Variables
   - Reformulation
9. Contemplation of Product
   - Length of Contemplation
   - Unit Contemplated
   - Effect of Product upon Self
   - Anticipated Effect upon Reader
10. Seeming Teacher Influence on Piece
    - Elements of Product Affected
      - Registers
      - Formulation of Title or Topic
      - Length
      - Purpose
      - Audience
      - Deadline
      - Amenities
      - Treament of Written Outcome
      - Other

(Adapted from Emig, 1971, pp. 34-35)

writing sessions and at home, was mental, without physical activity such as taking notes or outlining. His planning time ranged from less than one minute for school-sponsored writing to approximately 20 minutes for an episode of self-sponsored writing. Clarence paid little attention to revising, although he did spend some time on reordering groups of words.

In another study reported in 1974, Stallard found that longer planning time distinguished the writing processes of good writers. Stallard used an observational checklist, an interview, and an analysis of written products to investigate the composing behavior of his high school seniors. Stallard found that only one student made any kind of outline--four sentences numbered 1-4. He also found that the good student writers spent more time in completing the assignment and in contemplating the product, both during and after the first draft. Stallard concluded that "a major behavioral characteristic of the good writer is a willingness to put forth effort to make communication clearer to a reader" (p. 216). This conclusion was predicated on evidence that the good writers planned more, stopped longer and more frequently to review what they had written, and revised more than did the poor writers.

Whereas most research involves older students and adults, Sawkins (1975) examined the composing processes of fifth-grade students. Sawkins interviewed 30 boys and 30 girls of "average" ability. She then compared the students who wrote the 15 highest and 15 lowest rated compositions, as measured on an analytic scale. On the basis of the interviews and an analysis of students' compositions, Sawkins drew the following conclusions about fifth-grade writers:

1. Writers tend to consider aspects of content before they begin writing and while they are writing.

2. For the most part writers proceed with writing without first having made notes or an outline.

3. Most writers do not have the complete story in mind before they begin writing, but make the story up as they go along and decide on the ending about mid-way through the composition.

4. Fifth grade writers appear to give very little thought to choosing words for particular purposes, to the sentences they are writing, or to the paragraphing they use.

5. Many writers ask the teacher for help for spelling but do not ask for other kinds of help, even though they are aware of problems related to the content of their stories as well as to punctuation, capitalization, and paragraphing.

6. Most writers proofread after writing the first draft in order to check on various aspects of the mechanics of composition as well as, to a more limited degree, matters of content.

7. Most writers who choose to rewrite do so in order to produce a neater appearing paper. (pp. 47-48)

In another 1975 study at the elementary-school level, Graves examined the composing processes of second-grade children and concluded that their writing processes have three phases:

> Prewriting phase. This phase immediately precedes the writing of the child. Examples of factors related to writing observed in this phase were the contribution of room stimuli to thematic choice, art work behaviors, and discussions with other persons.
>
> Composing phase. This phase begins and ends with the actual writing of the message. Examples of phase factors were spelling, resource use, accompanying language, pupil interactions, proofreading, rereadings, interruptions, erasures, and teacher participation.
>
> Postwriting phase. This phase refers to all behaviors recorded following the completion of writing the message. (p. 231)

Graves and his associates report on another study at the elementary level (Graves 1981a & 1981b, Graves & Murray 1980, Calkins 1980a & 1980b). The Graves team spent the years 1978-1980 studying the writing of students in first through fourth grades. These students engaged in extensive writing practice that fostered composing abilities. Children

were observed before, during, and after writing activities in their regular classrooms, and the researchers kept detailed records of the students' writing behaviors. Occasionally, the writing activities were also videotaped. During videotaping, the student writer wore a small microphone so that the researchers could capture any vocal or sub-vocal behavior.

Narratives reporting the behavior of the young writers in the Graves project provide a rich source of data on the composing process. The data reveal that even first grade children can compose, and that many eight-year-old children are capable of writing to find out what they mean. In the process of discovering meaning, subjects willingly composed as many as ten unassigned drafts. Redrafting was particularly evident when the teachers discussed the compositions with the student authors and when students were encouraged to read and discuss other students' writing. This focus on revision helped students to develop a sense of audience and of clarity and cohesion as well as to acquire revising skills. The first revision skills students mastered were mechanical changes such as correcting spelling and punctuation. Interestingly, children who did not receive instruction in punctuation mastered as many as or even more punctuation skills than did those who received explicit drill and practice on punctuation. As they became more confident with the mechanical aspects of writing, the students revised content, adding information and reformulating whole texts. Furthermore, the more the students drafted and revised, the more proficient they became at writing.

In her 1979 study, Pianko examined aspects of the writing processes of ten remedial and seven traditional (i.e., both average and good)

writers who were freshmen in a community college. Each subject composed a 400-word essay on five different occasions. Participants were observed, videotaped, and interviewed. Observers recorded the length and number of occurrences for various writing behaviors.

Pianko reports that most students began drafting on paper before they had a complete idea of what they wanted to write. Although fourteen did some mental planning before drafting, students stated that they did most of their planning during composing. Most students wrote only one draft, which they reported was typical of their writing when it must be done within a certain time in class. Two behaviors, pausing and scanning, significantly influenced composing time and rate of composing. Traditional students paused to plan, and they rescanned to reorient themselves so they could decide what to write next. Furthermore, traditional students were more concerned with communicating their ideas than with correcting mechanics and usage. Remedial students, however, often paused for diversion or to determine whether surface elements of their texts were correct.

In another 1979 study, Perl examined the composing processes of five unskilled college writers. Each writer met individually with the researcher for five separate 90-minute sessions. The data collected were students' written products, tapes of their oral composing, and their responses to interviews. The data were coded and analyzed for the time and frequency of different composing behaviors.

All participants in Perl's study displayed consistent composing processes. They spent only about four minutes in pre-drafting planning, and this planning consisted generally of (1) rephrasing the topic until

a word or idea elicited an event in the student's experience, (2) turning a broad topic into two manageable subtopics for writing, and (3) associating various words with the topic. Perl's unskilled writers interrupted the flow of their drafting when they became aware of the surface features of writing. Thus they generally revised to fix mechanics, lexicon, and syntax. Table 2 displays an analysis of students' editing behavior.

Table 2

Editing Behaviors

	Tony	Dee	Stan	Lueller	Beverly	Total
Total number of words produced	1720	1271	1640	1754	2179	8564
Total form	210	24	49	167	100	550
Additions	19	2	10	21	11	63
Deletions	44	9	18	41	38	150
Word Choice	13	4	1	27	6	51
Verb Changes	4	1	2	7	12	26
Spelling	95	4	13	60	19	191
Punctuation	35	4	5	11	14	69
Total content	24	7	13	2	21	67

(Perl, 1979, p. 331)

Despite these editing efforts, students' essays still evidenced serious problems. Perl thinks this phenomenon may have been caused (1) by students' tendency to assume that their readers could understand their text and (2) by their selective perception, as is evidenced by the fact that they often read aloud what they thought they had written rather than what they actually did write.

Recently, the number of reported studies has increased. Major reports appearing in 1980 include those conducted by Gould, Glassner,

and Flower and Hayes. Gould videotaped approximately 50 adults, college graduates who ranked in the upper twenty percent on intelligence scales, as they composed business letters, either by dictating or writing with a pen or a typewriter. Some of Gould's results contradict findings from many studies, perhaps because the writing task was not typical of the tasks of other students. His writers rarely made notes, and they reviewed their texts infrequently. This review was brief and local. Revisions were few, local, and usually immediate rather than delayed. One important result, consistent with those of other studies, should be noted: Gould found that planning is a significant element of writing, consuming a high proportion of total composing time--65%.

The significance of planning is also reflected by changes in levels of activity in the brain. Glassner (1980) used an electroencephalograph to scan the activity of the left and right hemispheres of writers' brains as they composed. He obtained data for 30 college students, 15 men and 15 women between the ages of 18 and 22. These subjects were also videotaped.

Glassner first established a baseline rate of hemispheric activity for each writer. Then the writers composed with electrodes attached to their right and left temporal lobes. Some chose to write about familiar topics that did not pose either global or local planning challenges since the writers had repeatedly rehearsed the topics, either mentally or in spoken discourse. Because of this rehearsal, they could compose almost automatically, without consciously attending to planning their discourse. Under these conditions, an electroencephalograph measured higher levels of activity in writers' left brains than in their right brains. Interviews with the participants verified the automatic nature

of their writing at the time of their heavier left-brain activity. One writer, who wrote about an automobile accident she had been involved in, reported,

> I knew the words that I would say, as I have said them before to insurance investigators, lawyers, my family, and friends. It was as if a record was in my head that kept repeating itself. (p. 88)

Conversely, writers evidenced high levels of right-hemisphere activity when they chose unrehearsed topics that caused them to pause and engage in significant amounts of in-process planning.

Flower and Hayes (1980) report on their analysis of a five-year collection of protocols from novice and expert writers. Protocols are transcripts prepared from tape recordings of writers who think aloud as they compose. It should be noted that these tapes are not just records of oral composing, but of the problem-solving goals or plans that occur during writing as well (e.g., "I think I'll start with an anecdote").

Flower and Hayes found that good writers address all elements of the writing task. Conversely, poor writers are concerned primarily with the features and conventions of written texts, such as the number of pages to be written. Futhermore, expert writers create a rich network of problem-solving goals that help them generate content, while poor writers are concerned with statements about the subject; good writers continue to develop and modify their goals as they write, while poor writers frequently do not change their original perception of the task.

In a subsequent study, Flower and Hayes (1981) analyzed the location and duration of pauses in the protocols of three expert and one novice writer. They found that a high number of goal-related activities occur during the pauses before episodes of writing (i.e., units of sustained focus in the process of writing). Many such activities pertain

to process goals (instructions and plans writers give themselves for directing the writing process) rather than content goals (things writers might say). Flower and Hayes also discovered that paragraphs are poor predictors of long pauses; rather, long pauses occur when writers are engaged in goal-related activities (e.g., setting a new goal, evaluating a completed goal). Table 3 displays the results of the analysis of goal-related and other actions occurring at episode boundaries.

TABLE 3

ACTIONS OCCURRING AT EPISODE BEGINNINGS

	Goal Related Actions			Other Actions					
	Goal Setting								
	Setting Content Goals	Setting Process Goals	Acting on Goal	Evaluation	Review	Meta-Comment	Other	% Goal Setting	% Goal Related
Expert 1	10	5	2	1	1	6	6	48%	55%
Expert 2	14	14	16	3	2	3	3	51	80
Expert 3	25	14	17	10	4	4	2	51	74
Novice	20*	5	6	3	7	8	6	45	56
Average	18	10	10	4	4	5	4	49%	68%

*45% devoted to reviewing assignment or earlier goal (Flower & Hayes, 1981, p. 241)

Flower and Hayes additionally report that the length of time spent in episodes of drafting between pauses was greater for the expert writers than for the novice writer.

The timing of pauses was also an important design feature in Matsuhashi's recent study (1981) of four high school seniors who were considered skilled writers. The students were videotaped while sitting in a small office at a narrow desk. Two cameras were used, one aimed at the writer and the other at the writing pad the student used. Each

participant was involved in 14 writing sessions and composed in four discourse types, although Matsuhashi reports on only three. Matsuhashi found that pause-time increased according to the type of discourse students were composing, in the following order: reporting, persuading, and generalizing. Results of her analysis of pause time by discourse type are presented in Figure 1.

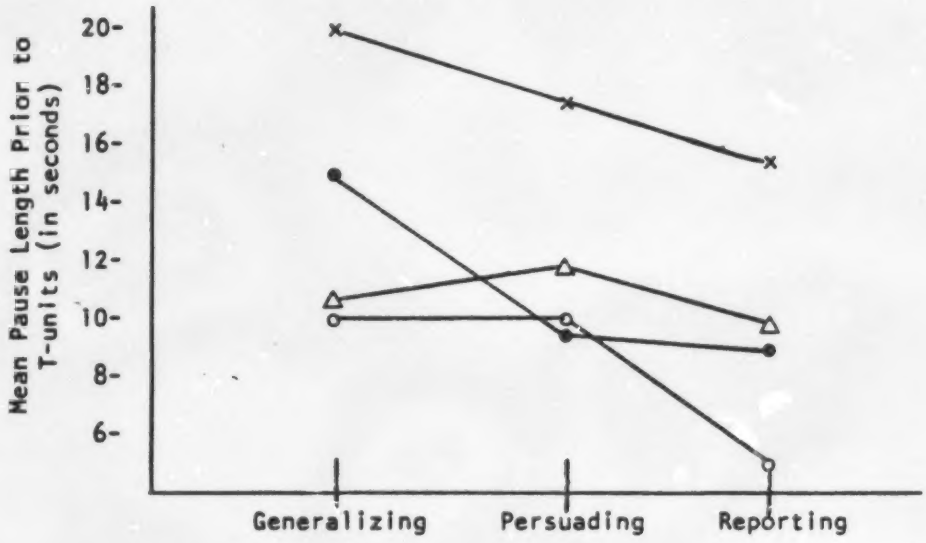

Figure 1. Mean Pause Length for Three Discourse Purposes (adapted from Matsuhashi, 1981, p. 124).

Matsuhashi also reports that her writers paused for a short time when they were planning their next words or phrases; they paused for longer periods when they were planning longer segments of text. She found that planning highly abstract sentences (superordinates) required more time than planning sentences that add supporting details (subordinates). The opposite was true for individual words: Writers paused for less time before superordinate (general) terms than before subordinate (specific) terms. Overall, Matsuhashi's skilled writers spent

more than half their total composing time in pausing. In a subsequently reported analysis of data from this study (1982), Matsuhashi and Spittle found that pause time is concentrated around predicates, and that modifiers come out in a rapid string.

Atwell (1981) found that all the participants in her study paused at some time during composing. She studied ten traditional and ten remedial undergraduate writers, who spent half their 20-minute composing period in "blind" writing. During this ten-minute period, participants wrote on textured paper that did not take an imprint; only the attached carbon copy was readable. Atwell found that the good writers spent more time in global planning than in local, sentence- and word-level planning, while the remedial writers spent more time in local planning. This focus on local planning made her remedial writers more dependent upon reviewing; they strayed further from the text when they could not review, thus writing somewhat less coherent texts. Conversely, the traditional students maintained their high degrees of textual coherence under blind-writing conditions because they could rely on the writing plans in their minds. Figure 2 displays a coherence map showing the change that occurred for one essay of one remedial writer, who was typical for the group.

Three recent major studies treated only one element of composing--the process of revising. These studies were reported by Sommers (1980), Bridwell (1980), and Faigley and Witte (1981).

Sommers studied the revising behavior of 20 freshmen college students and 20 experienced adult writers, mostly journalists, editors, and academics. Each participant composed three essays and rewrote each essay twice. Sommers also interviewed her participants after the third

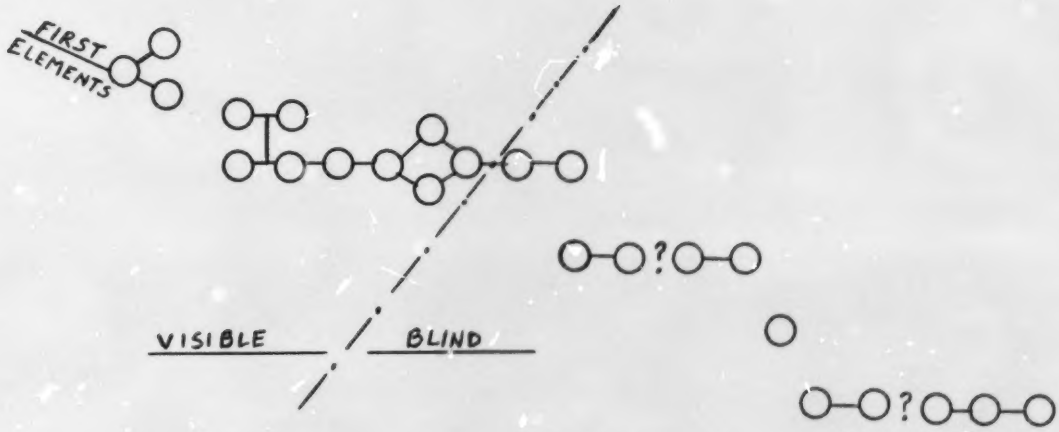

Figure 2. Map of an essay with moderate local coherence and no global coherence (Adapted from Atwell, 1981, p. 5). Circles represent elements of what Atwell terms the "microstructure." Lines represent text connections: lines connecting elements horizontally indicate statements at the same level; lines connecting elements vertically indicate that subordinate ideas are incorporated to develop superordinate concepts. High to low position of circles represents superordinate/subordinate levels of concepts.

draft of each essay. All drafts were analyzed for the frequency of revision operations (i.e., deleting, substituting, adding, and reordering) and for the levels of these operations (i.e., word, phrase, sentence, theme). Tapes of interviews were examined to determine writers' primary, secondary, and tertiary concerns when they revise.

Analysis of the revisions and the interviews indicated that the students writers did not employ either reordering or adding operations. Rather, they generally viewed revising as a rewording activity, and one of their greatest concerns was word repetition. Although students reported that they sensed the need for more global revisions, they hadn't learned strategies for making them. The revising behavior of the experienced adult writers differed from that of the students. Although the experienced writers revised most frequently by adding and deleting

at the sentence level, as a group they employed all revision operations at all levels. When interviewed, the experienced writers said that when they revise, their primary objective is to give shape to their writing.

In her inquiry into the revising process, Bridwell (1980) examined the writing of 171 twelfth-grade students. Writers composed on a designated topic during the first writing session, making changes in their text on that day. The drafts were collected and then distributed at a second session, at which teachers instructed the students to mark up their essays for any additional revisions and then write a new draft. The participants, who had written with blue pens during the first session, wrote with black pens at the second session so that the first draft, between-draft, and second-draft revisions could be distinguished.

Both drafts were collected and analyzed for changes at the surface level (e.g., spelling and punctuation), word level, phrase level, clause level, sentence level, multi-sentence level (i.e., two or more consecutive sentences), and text level. The analyses showed that surface- and word-level changes accounted for more than half the students' revisions. When students made any sentence-level changes, they usually made multi-sentence revisions. Furthermore, the greatest number of changes was made while composing the final draft. (See Table 4.) The essays were rated on an analytic scale, and the final revised versions were rated higher in quality than were the early drafts, verifying the importance of the revision process.

In a similarly designed study, Faigley and Witte (1981) examined the revising processes of six inexperienced student writers, six advanced student writers, and six expert adult writers. The expert writers revised at higher levels than did the student writers. The researchers report that the inexperienced students primarily corrected

TABLE 4

PERCENTAGES OF TOTAL REVISION FREQUENCIES AT LEVELS AND STAGES

Level	Stage			Level Percentage
	First Draft	Between Draft	Second Draft	
Surface	9.00	2.58	13.25	24.83
Word	12.87	5.07	13.30	31.24
Phrase	5.66	3.43	8.91	18.00
Clause	.86	1.22	4.23	6.31
Sentence	1.30	1.63	4.88	7.81
Multiple-Sentence	1.16	3.26	7.28	11.80
Stage percentage	30.85	17.29	51.85	

(Adapted from Bridwell, 1980, p. 207)

errors (made formal changes) and made meaning-preserving changes, most frequently substituting synonyms. Advanced student writers made many similar meaning-preserving changes; however, they also made structural changes that altered the meaning of their text. Although the expert adult writers made a substantial number of meaning-preserving changes, they also made substantially more changes that affected meaning than did either group of students. The results are displayed in Table 5.

TABLE 5

FREQUENCIES OF COMBINED REVISION CHANGES PER 1000 WORDS IN FINAL DRAFTS FOR THREE GROUPS OF WRITERS

	Formal Changes	Meaning-Preserving Changes	Structure Changes
Inexperienced Students	21%	65%	11%
Advanced Students	18%	58%	24%
Expert Adults	15%	50%	34%

(Adapted from Faigley & Witte, 1981, p. 406)

Summary

This paper has presented a review of the research focused on the process of writing. The research indicates that planning consumes a high proportion of composing time, and that planning entails making global as well as paragraph-, sentence-, and word-level decisions. When writers pause, they are usually planning, and the length of their pauses corresponds to the type of planning that is engaging them. Differences in planning behavior separate good from poor writers, with good writers spending not only more time in overall planning than poor writers do, but also more time in global rather than local planning.

During drafting, writers deal with a heavy mental load because they must call on requisite form skills (e.g., spelling and punctuation) in order to encode the content they are planning. Consequently, writers who have mastered these skills can draft out their ideas more rapidly. Thus when good writers review their texts, they review more for global elements, while less competent writers review for errors. These unsuccessful writers are also more dependent on reviewing.

The research has shown that revising is a process that is acquired as writers develop competence. In early stages of development, they concentrate on correcting errors and changing surface features in their texts. As they mature, writers progressively concentrate on restructuring and shaping their discourse, redefining their ideas as they compose, and adjusting their writing to meet their audiences' needs.

More information on writing will soon be available because more research is underway. This burgeoning interest in writing contrasts

sharply with the dirth of the early corpus--one study in 1946, the next in 1971. Perhaps any review published a few years from now will require volumes of prose rather than these few pages. That is something desired by all those interested in this vital aspect of education.

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